

WHAT IS CLAIMED IS:

1. A method for at least reducing the mineral content of a vascular calcified lesion, said method comprising:
  - 5 maintaining the local environment of said calcified lesion at a subphysiologic pH for a period of time sufficient for the mineral content of said calcified lesion to be reduced; whereby the mineral content of said calcified lesion is reduced.
2. The method according to Claim 1, wherein the local environment of said calcified  
10 lesion is maintained at a subphysiologic pH by introducing an acidic dissolution fluid into said local environment.
3. The method according to Claim 2, wherein said introducing comprises flushing said calcified lesion with said dissolution fluid.  
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4. The method according to Claim 1, wherein said method further comprises applying energy to said calcified lesion in a manner sufficient to breakup said lesion into particles.
5. The method according to Claim 4, wherein said method further comprises rendering  
20 said local environment substantially bloodless.
6. A method of at least reducing the size of a vascular calcified lesion, said method comprising:
  - 25 flushing said calcified lesion with an acidic dissolution fluid capable of locally increasing the proton concentration in the region of said calcified lesion; wherein the size of said calcified lesion is reduced.
7. The method according to Claim 6, wherein said acidic dissolution fluid comprises and organic or inorganic acid.
- 30 8. The method according to Claim 6, wherein said acidic dissolution fluid is a hydrochloric acid solution or a carbonic acid solution.
9. The method according to Claim 6, wherein said acidic dissolution fluid is hypertonic.
- 35 10. The method according to Claim 6, wherein said method further comprises rendering said local environment substantially bloodless.

11. A method for treating a host suffering from a vascular disease characterized by the presence of a vascular calcified lesion, said method comprising:  
flushing said calcified lesion with an acidic dissolution fluid capable of increasing the proton concentration in the local environment of said lesion for a sufficient period of time for the mineral content of said calcified lesion to be reduced,  
5       whereby said host is treated.
12. The method according to Claim 11, wherein said acidic dissolution fluid comprises an organic or inorganic acid.
- 10       13. The method according to Claim 12, wherein said organic or inorganic acid is hydrochloric acid or carbonic acid.
14. The method according to Claim 11, wherein said acidic dissolution solution is  
15       hypertonic.
15. The method according to Claim 11, wherein said method further comprises applying energy to said calcified lesion.
- 20       16. A system for flushing a vascular tissue site with a dissolution fluid, said system comprising:  
      (a) a catheter comprising an acidic dissolution fluid introduction lumen capable of delivering fluid to said vascular tissue site and a fluid removal lumen capable of removing fluid and lesion debris from said vascular tissue site, wherein said catheter is in fluid  
25       communication with an acidic dissolution fluid source;  
      (b) a first pumping means operatively linked to said fluid introduction lumen in a manner sufficient such that said first pumping means forces fluid out of the distal end of said fluid introduction lumen; and  
      (c) a second pumping means operatively linked to said fluid removal lumen in a  
30       manner sufficient such that said second pumping means sucks fluid into the distal end of said fluid removal lumen.
17. A kit for at least reducing the mineral content of a vascular calcified lesion, said kit comprising:  
35       a fluid capable of locally increasing the proton concentration in the region of said calcified lesion.

18. The kit according to Claim 17, wherein said kit further comprises instructions for practicing the method of Claim 1.